Space Weather Forecast

Issued on Thursday, 26 January 2023 at 01:20 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Ongoing likelihood of R1/R2 Radio Blackouts day 1, but easing thereafter. Slight chance of G1/Minor Storms, mainly day 1 and day 3 (26th and 28th)

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Three Moderate flares were observed on the 25th, all at R1/Radio Blackout level. The strongest was from a large sunspot in the southwest, and the other two from a smaller sunspot in the northwest. Both of these sunspot regions will soon rotate off the Earth-facing disc. There are a total of eleven sunspot regions, however beyond the two mentioned they are generally smaller and simpler. The main exception is a small region in the centre of the northern hemisphere, which despite its very small size does contain some potential magnetic instability. A further region in the northeast is also seeing further slow growth but currently remains simple. A coronal mass ejection (CME) was observed leaving the disc associated with the larger moderate flare, but is off the Earth-Sun line. No other CMEs were detected in available imagery.

Solar Wind / Geomagnetic Activity: Solar winds have mainly been at slightly elevated levels at 400-500 km/s. The Interplanetary Magnetic Field strength has been mostly weak throughout, but briefly became Moderate. The north-south component was also mainly weak, but did briefly point southward shortly after midday before rotating to a northward direction. The resultant geomagnetic activity was mainly Quiet (Kp0-2), but with an Unsettled interval 1200-1500, alongside that peak southward pointed field.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate solar activity is likely to continue on day 1 (26th), before easing to mainly Low as the larger sunspot regions soon rotate off the Earth-facing disc. Although these regions will continue to give a risk of observed Moderate flares, with a slight chance of strong flares day 1 and perhaps day 2 (26-27th). All other regions are currently smaller and simpler, with only a slight chance of Moderate flares.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs in this forecast. Solar winds are expected to become elevated day 1 (26th) due to the arrival of fast solar winds from a coronal hole, with another enhancement then expected later in the period, most likely day 3 (28th) Geomagnetic activity is expected to be Quiet with Unsettled spells for much of the period, but rising to Active with a slight chance of G1/Minor Storms.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently expected to remain at background with no solar radiation storms occurring. However there is a slight chance of the number of observed particles rising however, most likely if a Strong flare or similar would occur from the large sunspot rotating off the Earth-facing disc. This brings a slight chance of reaching the S1 Solar Radiation Storm level through days 1 and 2 (26th and 27th), before this risk declines.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	10	20	10
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	60	30	20	20
Very Active	R3 to R5 X	No	10	5	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	5	5
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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